Overview of the SOS Remote App

The iOS Remote Control App for SOS is an alternative to using the Wii controller to control an SOS system. It is a universal app that runs on either the iPad or the iPhone or iPod Touch. It can do everything the Wii does, but in a different fashion. In addition, the SOS Remote app has some features that the Wii does not. For example, the app can display the current playlist, allowing the user to jump from any clip to another within the playlist. Unlike the Wii, which uses Bluetooth as its means of communicating with SOS, the SOS Remote app uses Wi-Fi Internet access.

System Requirements

To be useful, this app requires access to a Science On a Sphere (SOS) installation. For further information about SOS see our web site at <http://sos.noaa.gov>. The app does nothing interesting until it is connected to a running SOS system.

The app also requires Wi-Fi access to the SOS computer that is being controlled (specifically TCP port 2468). Simultaneous outbound Wi-Fi access from the device to the Internet at large (or at least to the SOS web servers at http://sos.noaa.gov) is also desirable for some features of the app, but it not required for basic remote control of SOS.

There are two basic approaches to getting that Wi-Fi access. The first is to use the existing Wi-Fi infrastructure at your site. The second is to add a Wi-Fi router to your SOS installation. In either case, you will want to consult with your network and security team, for advice on the best approach for Wi-Fi connectivity at your site. In extreme cases, Wi-Fi network security policies may entirely preclude the use of the SOS Remote app. A direct connection to a dedicated Wi-Fi router is preferred for performance reasons, since the remote control protocol is "chatty" and sends lots of messages back and forth between the device and the SOS computer.

Using Existing Wi-Fi Infrastructure

If your site has an existing Wi-Fi infrastructure, you may be able (or required by policy) to use it to connect to your SOS system. The details of this will be specific to your site, so you will need to consult with your networking team for the specifics at your site. Many sites have multiple Wi-Fi networks, typically a low-security one for visitors and casual access, and one or more high-security for access to internal computers at the site. You will want to use the one that provides network access to your active SOS computer (TCP port 2468). There will be network passwords and/or VPN instructions that are specific to your site. See your network team for the details.

For the most responsive control of your SOS system by the app, you can connect a Wi-Fi router directly to your SOS computer. Doing this in a secure way requires some network expertise, so be sure to consult with your network team before attempting this. You may need to select a Wi-Fi channel that doesn't conflict with other Wi-Fi networks, for example. Using the minimum transmitter power that you need is always a good idea. And WPA2 encryption is probably the minimum level of encryption you will want to use. You might want to turn off the beacon identifier for your Wi-Fi router to make it less obvious to casual visitors at your site. You might also consider limiting access to the specific MAC addresses of your portable devices. The details of router configuration are beyond the scope of this document, so consult with your network team when in doubt.

The SOS computer has two network interfaces: one to the external Internet, and one for a private subnet. For maximum functionality, connect the router between the external Internet and the SOS computer. This will allow your remote control to access both the SOS and to the Internet at large. The default NAT (Network Address Translation) of the router will allow both the SOS machine and the Wi-Fi devices to share the Internet connection. You may need to change the outward IP address configuration of your SOS system.

As an alternate but less desirable approach, you can connect the router to the private subnet. This provides maximum security in the event your router is compromised, since the private network doesn't allow connecting beyond the SOS computer. The downside is that a number of features of the app will not be available. But the basic remote control of the sphere will still work.

Installing the App

To install the SOS Remote app on your device, follow these installation instructions from Apple:

Installing an Application for Testing

After being registered in a developer's testing program, the developer sends you an archive of the test application. You need to install the archive into iTunes to run the application on your device.

To install the test application on your device:

1. In the Finder, double-click the application archive, <Application_Name>.ipa. The application appears in the iTunes Applications list.
2. Sync your device.

If the version of iOS on your device is earlier than the test application can run on, you need to update your device with the current release of iOS.

For more information regarding sending crash reports to developers, please see the iOS Development Guide:

https://developer.apple.com/library/ios/#documentation/Xcode/Conceptual/iphone_development/145-Distributing_Applications/distributing_applications.html#//apple_ref/doc/uid/TP40007959-CH10-SW10

Configuring the App

In order to control Science on a Sphere from your iPad, iPhone, or iPod Touch device, you must configure your device to communicate with your SOS computer. To get started, tap on the Settings app icon on the homepage of your device, and then tap on SOS Remote located under the Apps category. In the Name field under SOS computer to control, enter the host name of your SOS computer. This will be the default host name.

Now, return to the homepage and tap on the SOS Remote app icon to open the application. Tap on the Settings icon located in the tab bar to open the SOS Settings page. On this page, you will find a section labeled SOS Host Name. If the host name of the SOS computer you will be connecting to is different than the host name you just entered in the general Settings app, then enter the new host name in the text field (this host name will be active for as long as the SOS app is running); otherwise, leave it as is (the default host name will automatically be filled in to the text field).

Now that a host name has been entered, tap the ON/OFF slider to the ON position. This should initiate the connection between the device and the SOS computer.

Using the App

Once a connection has been established between your device and the SOS computer, you are now ready to control the SOS display.

Alignment

On the SOS Settings page, you will find a section labeled Alignment. To perform alignment of the projectors on the sphere, tap on the Start Alignment button. This will bring up all the controls necessary to perform traditional alignment. **Please proceed with caution here, as only experienced users should attempt alignment.** The buttons and controls on the alignment interface are labeled and are for the most part synonymous with the controls used on the Wii Remote. Please refer to the Science on a Sphere Training Manual for more information on these

alignment controls. Note that the circular buttons labeled 1 through 4 are used for selecting the desired projector to manipulate. Also note that the arrow keypad is active based on the command button you have selected. So, for example, if you tap on the Scale button, the arrow keys will only perform scale operations on the sphere. Tapping on Vertex Tweaking brings up the Vertex Tweaking interface. Note that the smaller buttons labeled 1 through 9 are use for selecting a particular vertex on the currently selected projector.

Orientation

Tap on the Presentation icon located in the tab bar. This will open the SOS Presentation page, which consists of orientation and playback controls.

Before manipulating the orientation of the sphere, first use the User Position slider bar to set your desired viewing position relative to the sphere. When you tap on the slider, a red dot will appear along the equator of the sphere (the default position places the red dot on the default positive x-axis of the sphere).   Move the slider left or right until you see the red dot in front of you or at any other desired location on the sphere. Now, all future orientation adjustments will occur relative to this view position.

To adjust the orientation of the sphere, simply slide one finger over the arrows indicated on the track pad. In the default user/slider position, the up-down arrows tilt the sphere around the y-axis (pitch), the left-right arrows rotate the sphere around the z-axis (yaw), and the two arrows on either end of the track pad tilt the sphere around the x-axis (roll). Again, all rotations are relative to the user position you selected using the slider bar.

To automatically rotate a time-series dataset around the z-axis (the axis that passes through the north and south poles), tap the Z-Rot button. Note that the automatic z-rotation will only be active when the time-series is animating.

To reset the orientation of the sphere back to its default position, tap the Reset button.

Playback

Open the SOS Presentation page if you are not there already. To pause or play a dataset, tap the Pause/Play button. Alternatively, you can tap once within the extents of the track pad pause/play a dataset.

To step forward or backward frame-by-frame, tap the forward and backward buttons, respectively. To fast forward or fast backward quickly, tap and hold the forward and backward buttons, respectively. Note that tapping the forward or backward buttons automatically pauses the dataset once you release.

To go to the next or previous clip in the playlist, tap the Next or Prev buttons, respectively.

Datasets

To access the current playlist or the SOS library of datasets, tap on the Data Sets button found either in the tool bar (iPad) or the tab bar (iPhone and iPod Touch) to bring up the Data Sets page.

Then, tap on the Playlist label to view the current playlist that is loaded on the SOS system. To load a particular clip from the playlist onto the sphere, simply tap on the name of the dataset.

To view other datasets in the SOS library, tap on the Category label and then select a category. This will automatically bring up the Library page that shows all clips in the selected category. To load a clip from this library onto the sphere, simply tap on the name of the dataset. Note that selecting categories and datasets from the Category and Library pages does not erase or alter the current playlist.

Web Page

To view the Science on a Sphere Data Catalog and the rest of the SOS website, tap on the Web Page item in the tab bar.

Known Issues

Although all of the important base functionality needed to run an SOS display is present in this version of the iOS Remote Control App for SOS, please note that it is still in its initial stages and that the future release of this app will include modifications and enhanced usability and functionality.

The Alignment interface is very easily accessible to all users of the SOS Remote app. Using the alignment controls without understanding how alignment works, or accidentally tapping on alignment controls can cause the sphere to become completely unaligned. In the future, the Alignment interface will be more hidden or even created as a separate SOS app accessible only to authorized users.

On the SOS Settings page within the SOS Remote app, the default host name you entered in the device's general Settings app should appear automatically under the SOS Host Name label. However, sometimes this text field does not get updated immediately. So to refresh the text field, simply switch to any different page on the SOS tab bar, and then switch back to the SOS Settings page in order to see the text field updated with your default host name.

When the iPad is oriented in the horizontal position and the Presentation page is selected, if you select a clip from the Playlist or the Library, that clip name will be highlighted on the interface and the corresponding dataset will be displayed onto the sphere. However, if you now tap the Prev or Next buttons, the prev or next dataset will be displayed onto the sphere, but the corresponding clip name will not be highlighted on the interface. To work around this, rotate the iPad to the vertical position, and then re-rotate it into the horizontal position. The correct clip name should be now be highlighted.